THIS MANUAL IS CURRENT
FOR MDBS 3.09

MDBS III

DESIGN MODIFICATION UTILITY

REFERENCE MANUAL

VERSION 3.09

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Micro Data Base Systems, Inc.

P. O. Box 248

Lafayette, Indiana 47902

USA

Telex: 5106017487 (MDBS LAF UQ)

(800) 344-5832

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1 INTRODUCTION

I. INTRODUCTION

An important facility for a data base management system is the ability to make simple changes to the physical structure and security access restrictions of a data base without regenerating the data dictionary or re-entering data. In addition, it is often convenient to know information about the unused storage space within a data base, the total amount of free space and how it is dispersed throughout the data base. When it is seen that the data base is becoming full, it should be possible to physically expand the size of the data base. The optional MDBS.DMU module provides these capabilities with a minimum of effort by the user.

End users will find DMU of value in adding, deleting, or modifying user passwords and access codes. It is also valuable when changing the physical placement of areas. Furthermore, DMU can be used in monitoring free disk space and calculating efficiencies. In a multiuser environment, DMU should not be executed while the MDBS.DMS program is operating.

An OEM can mass ship DMU along with application software (and authorized MDBS run-time tokens) and not be concerned with the physical environment of the end user. For example, suppose that XYZ, Inc. is an OEM that has developed an accounting system with MDBS III. Suppose also that XYZ defined storage for the general ledger of its package totaling as many as 4096 pages of 2048 bytes each. How does XYZ deliver this package to its customers? And if a client with a one megabyte capacity purchases the accounting system, how can this be reconciled with the DDL specification of over eight megabytes of ledger data?

DMU addresses these questions. With the MDBS DDL, XYZ can specify a shortened initialization sequence (with the **o** or **s** option). This option initializes only the minimum number of pages of system information necessary to define the ledger. Thus XYZ can send out very small versions of each data base, presumably on floppy diskettes or magnetic tape. When the end user receives his copy of the accounting system, he can execute DMU and expand the ledger area to any size up to the 4096 pages specified in the DDL declaration. Thus end users can control the size of an application data base to suit their needs and hardware capacities.

Upon receiving the accounting system, the customer can use DMU to change user passwords, add new users, and delete existing users. It is strongly recommended that a customer's access to DMU be highly centralized, so that the customer can carefully control user names, user passwords and user access codes. All such changes should be made through a central authority who bears the responsibility for controlling data base access. It is also advisable that this central authority exercise control over the DMU ability to change the physical placement of areas (i.e., drive qualifiers for names of files to which areas are assigned). Finally, the central authority should also be in charge of using DMU to periodically monitor a data base's free space and to expand the size of the data base as necessary.

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MDBS DMU MANUAL
Introduction

The MDBS.DMU system functions by prompting the user for necessary information and then executing the indicated changes to modify the data base and/or data dictionary. For simplicity, this system prompts fully. Should the user enter an incorrect response, the system issues a warning, protects the data base from any changes, and prompts again.

NOTE: As with all programs that modify a data base, we advise that the user make a backup of the data base before using MDBS.DMU.

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II. DMU FEATURES

MDBS.DMU is an optional component of MDBS III and is packaged as an executable file. For most operating systems, you invoke DMU by entering the name of the executable file and any appropriate command line arguments. The precise syntax to invoke DMU is in chapter VIII of your MDBS III System Specific Manual.

MDBS.DMU has several optional command line arguments that control things such as the amount of workspace for data base page buffers and the operating mode (interactive or batch) of DMU. The following command line arguments are available for DMU:

–b*nnnnn*

This argument explicitly allocates the page buffer region. ***nnnnn*** is the (decimal) number of bytes to be allocated for the page buffer region. This number should be at least as large as the "minimum DMS buffer region size" reported by the DDL Analyzer; otherwise DMS command status error 31 results.

If this argument is not specified, DMU automatically allocates approximately half of the available memory. DMU reserves the remainder of its workspace for items such as file control blocks, a stack, and sort work areas.

If too large a page buffer region is requested, an error message indicating "excessive memory request" is displayed. The remaining memory reserved for non-data base working space is normally sufficient. However, in rare cases this working space may be insufficient, resulting in various kinds of error conditions and situations where the data base may be left open. In such a case, you can specify a smaller page buffer region with the **b** argument to allow a larger non-data base working space.

–d*dbname*

The **d** argument specifies the data base to use with DMU. ***dbname*** is the fully qualified, operating system file name of the main data base area. If this argument is omitted from the command line, DMU prompts the user for this information.

–i*filename*

The **i** argument specifies that DMU operates in batch mode and is to perform the commands within the file ***filename***. ***filename*** is an ASCII text file consists of the menu selections and other responses to DMU prompts. It is a keystroke file.

–m The **m** option suppresses (mutes) the display of the initial banner message for DMU. This option is intended primarily for original equipment manufacturers that call DMU from another program.

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–ppassword

The **p** argument specifies the data base password for the user. As with the arguments for the data base name and user, if this argument is omitted from the command line, DMU prompts you for a valid password before providing access to the data base.

–uusername

This argument specifies the name of the person to access the data base. ***username*** is any valid user defined for the data base. (The user name is defined in the user section of the DDL source text or is defined in a previous session with DMU.) If the **u** argument is omitted from the command line, DMU prompts you for a valid user name.

When a user invokes the DMU module, DMU displays its banner message on the console screen (Figure II-1), unless the m argument has been specified on the command line.

```
MDBS DMU Ver 3.09a
(C) COPYRIGHT 1981,1987 Micro Data Base Systems, Inc.
Lafayette, IN 47902
Serial Number:  xxxxxxxx
        Data base:  JOBS.DB
        User name:  D LEHR
        Password:
```

Figure II-1. DMU Banner Message and Initial Prompts

Before permitting access to the data base, the system prompts for the name of the file holding the main data base area, the user name, and password. See Figure II-1. The password is not echoed to the console when it is entered. These prompts can be suppressed by including **d**, **u** and **p** arguments on the command line used to invoke DMU.

If valid user and password information are provided for the data base, DMU opens the data base* and performs one of the two following tasks:

- Expand a new data base
- Display the main DMU menu and prompt the user for a selection

*If DMS error 15 or 16 was encountered the last time the data base was used, then DMU does not automatically open the data base. Instead, a message is issued, warning of possible data inconsistency. A prompt is then displayed which asks whether the data base should be reset so that it can be opened. If the user requests a reset, then the data base can then be opened by DMU (or any other DML program). If the data base has been reset, a message to that effect is issued when DMU opens it. However, after DMS error 15 or 16 occurs complete consistency of all data cannot be presumed.

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If the data base has been initialized with the DDL **o** or **s** options and has not yet been expanded, then the following message is displayed:

This Data Base was initialized with the Short option in DDL.
It must be expanded before it is used.

DMU then issues a prompt for each area, showing the smallest and largest permissible sizes for that area. The user responds by selecting a size for the area and DMU expands the area to this user- specified size. This is repeated for each data base area.

The second possibility is that the data base has already been expanded by using the default DDL initialization or by using DMU. In this case, the main DMU menu (see Figure II-2) is displayed and the user can choose any of its six options by entering a displayed mnemonic. When a main menu option is selected, the user is prompted with an appropriate menu of suboptions. Once a main menu DMU option completes, either through its exit suboption or due to an error in using one of its suboptions, the system returns to the main menu and prompts the user for the next selection.

DMU Options:

(S) Summarize free space statistics
(D) Define new areas
(P) exPand data base areas
(A) Add, change, or delete users
(C) Change default file names
(E) Exit DMU

Selection?

Figure II-2. Main DMU Menu Options

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GET FREE SPACE STATISTICS

The free space statistics provide information about the available free space and CALC record placement for one or more data base areas. The statistics include the size and number of free space holes and CALC record overflows.

A free space hole is a contiguous group of unused bytes that is available for storing data. This option allows a user to find the frequency of holes and the total space occupied by these holes in the data base areas. DMU collects the hole information into several size classifications and displays the results in a table. The percentage of free bytes in the area is displayed with the total amount of free space in the area.

A CALC record overflow occurs when a record with a CALC key is created and it encounters another data base element at the CALC address. The new record is inserted into the data base at the next available location in the data base area. This option displays the number of calc record overflows for a data base area along with the free space statistics.

When the S option is selected, DMU displays a "statistics" menu. As shown in Figure II-3, this menu provides three suboptions:

- **All areas** - display statistics of each data base area
- **Individual area** - display statistics for one specified area. DMU prompts for the area name to display statistics. Enter any area name,including the main area name
- **Exit to main DMU menu** - leave the statistics option

Sample DMU Session Using the Statistics option

Selection? *S*

Statistics Menu:
All areas: **A**
Individual area: **I**
Exit to main DMU menu: **E**

Selection? *I*

Area? *job1*

Area JOB1

Range:	0–50	50–128	129–256	257–384	385–512	totals	%free
Bytes:	0	0	144	672	2560	3376	13.18
Freq.:	0	0	1	2	5	8	

0 CALC Record Overflows

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Selection? *S*

Statistics Menu:
All areas: **A**
Individual area: **I**
Exit to main DMU menu: **E**

Selection? *A*

Data Base Statistics

Area JOBS

Range:	0–50	50–128	129–256	257–384	385–512	totals	%free
Bytes:	0	0	0	352	22680	23032	89.96
Freq.:	0	0	0	1	45	46	

0 CALC Record Overflows

Area JOB1

Range:	0–50	50–128	129–256	257–384	385–512	totals	%free
Bytes:	0	0	144	672	2560	3376	13.18
Freq.:	0	0	1	2	5	8	

0 CALC Record Overflows

Area JOB2

Range:	0–50	50–128	129–256	257–384	385–512	totals	%free
Bytes:	0	0	140	305	4864	5169	20.19
Freq.:	0	0	1	1	11	12	

3 CALC Record Overflows

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DEFINE NEW AREAS

This option allows you to increase the data base size by creating one or more new data base areas for the data base. DMU allows new areas to be created, up to the maximum number of allowable areas for the data base (8 areas in Version 3c; 16 areas in version 3a).

As the sample session shows, DMU displays prompts to obtain the characteristics of the new area. This information includes the following items:

- area name
- area file name
- total number of pages in the area
- number of initialized (expanded) pages in the area
- pointer placement within the area
- page size (asked only for version 3c)

Sample DMU Session Using the Define Option

The following sample session shows a new area (the third area) being created for the JOBS data base. User responses are in italics. Default responses appear within square brackets [like this]. To enter a default response, press the carriage return key.

Selection? ***d***

Area [3]
Enter new area name: ***job3***
Enter new file name [job3.dba]:
Enter the total number of pages in the new area [4095]: ***20***
Enter the total number of pages to initialize [20]: ***10***
Are pointers allowed? [Y]: ***Y***
Enter page size [512]:

Creating file job3.dba

More areas (Y/N)? [N]:

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PERFORM DATA BASE AREA EXPANSION

After data has been loaded into a data base, the DMU S option can be used to see how full the data base areas are becoming. When an area is nearly full, it can be expanded to make room for more data. This is accomplished with the P option in DMU. This option results in a series of prompts for new area sizes as shown in the example in Figure II-5. Notice that for each area a range of permissible sizes is provided to the user. DMU will generally allow an area to be expanded to a size somewhat larger than the maximum specified in the DDL, and thereby overcome mis-estimations of area size at design time. Areas which may contain CALC records are not permitted to be expanded.

Sample DMU Session Using Expand Option

This session uses a data base created from a modified version JOBS.DDL that is included with your MDBS system. JOBS.DDL has changed in one way; it no longer contains any records with CALC keys. User responses are in italics.

Selection? *P*

Area JOBS

Enter number of pages (6<=number<=252),
(0 to skip expansion of this area): *50*

Operation in progress

Area JOB1

Enter number of pages (3<=number<=252),
(0 to skip expansion of this area): *20*

Operation in progress

Area JOB2

Enter number of pages (3<=number<=252),
(0 to skip expansion of this area): *25*

Operation in progress

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MODIFY, ADD, OR DELETE USER INFORMATION

This option lets you change the user information within the data base. You can modify, add to, or delete entries from the list of valid user names and passwords in the data dictionary. To access an entry in the list, you must have all read access codes and write access codes of that entry (user name and password). Upon entering the A option, DMU displays the User Change Menu of Figure II-3 and provides the following options:

```
User Menu:
Modify:                    M
Add:                       A
Delete:                    D
Exit to new DMU option:    E
Enter option :
```

Figure II-3. User Change Menu

Modify

This suboption prompts for the user name and associated password to be changed; the access codes for the user are unchanged. DMU does not echo passwords to the console for security reasons. If the user name and associated password do not correspond to an entry in the user list, DMU leaves the data dictionary intact; no change is made.

Add

You can add a new user to the user list in the data dictionary and assign access codes for read and write access that correspond to your access codes or are a subset of your access codes. The permissible access codes consist of the letters **a** through **p**.

This suboption prompts you for the new user name, the new read and write access codes, and the new password. The password is not echoed to the console. You can enter access codes in any of four ways:

- Enter the **default read access code** - press the carriage return to assign the read access code of 'a'

- Enter the **default write access codes** - press the carriage return to assign the user write access codes that are identical to his read access codes

- Enter **one read and write access code** - enclose a letter in parentheses and press return to assign a single letter as both read and write access codes

- Enter **many read and write access codes** - enclose one or more ranges of the following form and press return to assign several letters as read and write access codes

(range1, range2, . . ., rangei)

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A **range** is a single character or two characters separated by a hyphen (-). Each range specified in the string must be separated by commas. The new user access codes consist of all of the listed single characters and the characters that lie alphabetically between the characters separated by the hyphen. Specify each hyphenated range in increasing alphabetic order. That is, valid ranges include (a-b), (b-g), and (d-p); ranges specified as (b-b) and (d-c) would result in error messages.

Delete

You can delete a user from the user list in the data dictionary. This suboption prompts you for the user name and associated password to be deleted. As with the modify and add suboptions, DMU does not display the password on the console. If this password and user name do not correspond to an entry in the user list, the data dictionary remains intact; the user entry is not deleted.

Since you can delete your own user name and password, **be careful not to delete all remaining data base users.** If you delete all users from the user list, no one can access the data base. Also, if you delete your entry from the user list, there is no guarantee DMU will continue to process your requests.

Sample DMU Session Using the User Change Option

Selection? ***A***

User Menu:

Modify: **M**
Add: **A**
Delete: **D**
Exit to new DMU option: **E**

Enter option : ***M***
Old user name: ***D LEHR***
Old password :
New user name: ***D LEHR***
New password :

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CHANGE FILE NAMES

This option lets you change the file name (stored in the data dictionary) for one or more areas of the data base. The data base control system uses these area file names as the default file names when opening or closing data base areas.

DMU displays the "Change file name" menu as shown in Figure II-6). If you choose the "All areas:" suboption, DMU displays each area name. DMU prompts for the new physical file name.

If you choose the "Individual area:" suboption, DMU prompts you for the area name and the associated physical file name. The new file name must be fully qualified within the host operating system (see the pertinent system specific manual).

Remember to change the appropriate file names at the operating system level to maintain access to those area file names you changed.

Sample DMU Session Using Change Option

Selection? *C*

Change file name suboptions:

All areas: **A**
Individual area: **I**
Exit to new DMU option: **E**

Selection? *I*
Enter area name: *JOB1*
Enter new physical file name: *ALTJOB1.DB*

EXIT DMU

This option closes the data base and returns the user to the operating system.

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MDBS DMU MANUAL
Message Descriptions

III. MESSAGE DESCRIPTIONS

This section lists the possible messages that could be encountered when using MDBS-DMU. For each message, there is an explanation of its meaning as well as its possible cause.

DMS COMMAND STATUS: nnn

Explanation:

This message may accompany any other DMU message and provides a decimal DMS Command Status Descriptor (nnn) under which the user may find more information. Refer to your DMS Manual for details.

Possible Causes:

1. Any condition that causes a DMU message to be displayed

Area xxxxx could not be opened on file xxxx

Explanation:

DMU could not open the specified area from the specified file.

Possible Causes:

1. Incorrect disk, does not contain data base area
2. Incorrect data base area name
3. Inconsistent or invalid area file

Cannot change area file name

Explanation:

DMU unable to access physical file to execute the logical name change.

Possible Causes:

1. Incorrect disk, does not contain data base area
2. Disk not in place
3. Invalid physical file name

Cannot close data base or data base area

Explanation:

Upon exit, DMU attempted to close the data base, and failed.

Possible Causes:

1. Incorrect disk, does not contain main data base area
2. Disk not in place

Note: This error may indicate that the data base has been damaged.

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Cannot expand data base or data base area

Explanation:

Operating system error during data base expansion.

Possible Causes:

1. Insufficient room for expansion
2. Bad or damaged sector on disk
3. Operating system I/O error

Note: This error will most likely leave the data base in a damaged state.

Cannot open data base using given parameters

Explanation:

DMU could not open the data base.

Possible Causes:

1. Incorrect disk, does not contain main data base area
2. Incorrect data base file name
3. Invalid user name or password

Illegal user addition

Explanation:

DMU could not add the specified user.

Possible Causes:

1. Specified user already exists
2. DMU user does not have sufficient access permission

Illegal user modification

Explanation:

DMU could not modify user's name or password.

Possible Causes:

1. Old user name and password did not correspond
2. New user name and password combination already exist

Illegal user deletion

Explanation:

DMU could not delete the specified user.

Possible Causes:

1. Specified user name and password did not correspond
2. Specified user does not exist

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Insufficient write access

Explanation:

DMU was unable to carry out the requested operation.

Possible Causes:

1. DMU user does not have permission for requested operation

Invalid access code entry

Explanation:

DMU unable to analyze the entered access code.

Possible Causes:

1. Entered access code not in correct format
2. Entered access code not in range used by data base
3. Range of entered access code not in ascending order

Invalid area name

Explanation:

No area of the specified name is defined for this data base

Possible Causes:

1. Misspelled area name

Invalid option selection

Explanation:

DMU unable to recognize the user's selected option.

Possible Causes:

1. User attempted to select an unimplemented option

Page count of nnnn is not within allowable range

Explanation:

DMU detected that requested expansion size was out of range of the limits for the data base.

Possible Causes:

1. User entry was out of range

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DOCUMENT CONTINUED

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